



Australian Government

PCT/AU2004/000422

REC'D 21 APR 2004

WIPO

PCT

**PRIORITY
DOCUMENT**

SUBMITTED OR TRANSMITTED IN
COMPLIANCE WITH RULE 17.1(a) OR (b)

Patent Office
Canberra

I, LEANNE MYNOTT, MANAGER EXAMINATION SUPPORT AND
SALES hereby certify that annexed is a true copy of the Provisional specification
in connection with Application No. 2003902064 for a patent by AUSTRALIAN
AGRICULTURAL CHEMICALS as filed on 30 April 2003.

WITNESS my hand this
Fifteenth day of April 2004

LEANNE MYNOTT
MANAGER EXAMINATION SUPPORT
AND SALES



BEST AVAILABLE COPY

A COLORANT COMPOSITION

FIELD OF THE INVENTION

The present invention relates to a colorant composition. In particular, the present invention relates to a colorant composition suitable for colouring turf grass. Although the present invention will be described with particular reference to this application, it will be appreciated that the composition may find other applications and no limitation is intended thereby.

BACKGROUND OF THE INVENTION

Turf grasses are widely used in recreational areas, parks, golf courses, bowling greens, athletic fields and domestic lawns. There is a demand for turf to have a uniform green colour so as to provide a pleasing appearance. This is particularly so for televised sporting events where it is desirable that a playing field have a healthy looking and uniform green colour. However, under adverse conditions such as drought and frosts, grass can lose its natural colour and in some circumstances change to an undesirable appearance. Turf colorants that can impart a green colour to discoloured turf have been developed with a view to artificially returning a playing field to a desirable colour or to simply make the turf appear more robust and healthy. Green colorants are also used to colour sand and in particular, divot sand as used on golf courses.

A green colorant that is widely used commercially is marketed under the trade name "Green Lawngr" and is manufactured by Becker Underwood, Inc. Green Lawngr is a pigment based colorant comprising a water insoluble pigment suspended in an aqueous solution. In practice, application problems may be experienced when applying pigment based colorants. Such problems include blockage of application nozzles and equipment cleaning difficulties.

Other colorants for use in the agricultural industry are also available. Such colorants are based on water soluble dyes. As the dyes are water soluble, the above-mentioned application difficulties associated with pigment based colorants are generally not experienced. The dye based colorants typically contain blue or red dyes and are used as markers for spraying herbicides, insecticides and the like. Blue colorants are also used to impart a blue colour to

water features. The blue dyes may also be used on turf but impart a blue colour, which is generally not considered desirable.

However, there are some concerns regarding repeated use of colorants on playing fields and the like for a number of reasons. First, there are potential toxicity problems to those spraying the dyes and those playing on, or otherwise using the field. Although dyes and pigments commonly used to colour turf are considered safe to human health, there are few, if any, studies on long term exposure of these chemicals. Still further, there may be potential environmental hazards associated with build up of these chemicals in the environment as a result of repeated spraying. Generally a respray is necessary whenever the grass is cut. In some cases, a playing field may be sprayed at weekly or fortnightly intervals immediately prior a match or game being played on the field.

It is therefore an object of the present invention to provide an alternative colorant composition that is suitable for use on turf or other suitable surfaces.

DESCRIPTION OF THE INVENTION

According to a first broad form of the invention there is provided a colorant composition comprising a water soluble humic and/or fulvic acid and a colorant.

The present inventor has surprisingly and unexpectedly discovered that by combining a water soluble humic and/or fulvic acid with a conventional colorant that significantly reduced amounts of colorant are required to impart a similar level of colour and intensity. This enables the amount of colorant that is used in a colorant composition to be reduced and in some cases, significantly reduced.

Humic acids are the fraction of humic substances that are not soluble in water under acidic conditions but are soluble at higher pH values. Fulvic acids are soluble under all pH conditions.

Colorants suitable for use in the present invention include any suitable dye or pigment. Preferred colorants are water soluble dyes.

Preferred dyes for use in the composition of the present invention are anionic dyes. Whilst not wishing to be bound by theory it is believed that the anionic dyes are less likely to precipitate in the presence of anionic components of humic and/or fulvic acid salts.

Especially preferred dyes are those containing organic acid groups, e.g., sulfonic, sulfamic, phosphoric, carboxylic, etc., or their salts. Acid dyes are commonly alkali metal such as sodium or potassium, or ammonium salts of an organic acid. Preferred dyes are salts of sulfonic acids such as acid blue 62 (Sodium 1- amino- 4- (cyclohexylamino)- 9, 10- dihydro- 9, 10- dioxoanthracene- 2- sulphonate); acid blue 74 (Disodium 5, 5'- (2- (1, 3- dihydro- 3- oxo- 2H- indazol- 2- ylidene)- 1, 2- dihydro- 3H- indol- 3- one)disulphonate); acid blue 1 (Hydrogen [4- [4- (diethylamino)- 2', 4'- disulphonatobenzhydrylidene]cyclohexa- 2, 5- dien- 1- ylidene]diethylammonium, sodium salt); acid blue 185 (CAS 1330- 39-8); acid blue 9 (Dihydrogen (ethyl)[4- [4- [ethyl(3- sulphonatobenzyl)]amino]- 2'- sulphonatobenzhydrylidene]cyclohexa- 2, 5- dien- 1- ylidene](3- sulphonatobenzyl)ammonium or disodium salt); acid green 1 (Trisodium tris[5, 6- dihydro- 5- (hydroxylimino)- 6- oxonaphthalene- 2- sulphonato(2-)- N5, O6]ferrate(3-) and acid green 50 (Hydrogen [4- [4- (dimethylamino)- a- (2- hydroxy- 3, 6- disulphonato- 1- naphthyl)benzylidene]cyclohexa- 2, 5- dien- 1- ylidene]dimethylammonium, monosodium salt) or mixtures or any two or more thereof. Other suitable colouring agents are the phthalocyanine pigments of which Copper phthalocyanine blue or Pigment blue 15 is an example.

Especially preferred are the acid blue dyes, of which a sample is mentioned above. Such blue dyes are often used to impart a blue colour to ponds and water features. Blue dyes are also used as marker dyes to assist in identifying which areas of vegetation have been sprayed with a herbicide, insecticide or the like. Blue dyes may also used as bases for green colorants. A yellow dye such as tartrazine (acid yellow 23) may be combined with the blue to provide a desired green colour.

It will be appreciated that any combination of two or more colorants may also be used in the composition of the present invention. The selection and formulation of such colorants will depend upon the desired result. This may be determined by one of skill in the art.

The present inventor has also very surprisingly and unexpectedly discovered that the combination of humic and/or fulvic acid with a blue dye

produces a green colorant without requiring the addition of further yellow dyes or colouring agents.

The relative amounts of humic and/or fulvic acid may be varied depending upon the desired colour and end use. Suitably the composition may contain
5 between about 30:1 to about 1:30, preferably between about 10:1 to about 1:3 parts by weight of humic and/or fulvic acid and colorant. Similarly, the actual amounts of dye and humic and/or fulvic acid in the composition may be varied according to the nature of the dye, desired colour and end use. Suitably a composition may include between about 10 to about 30wt% humic and/or fulvic
10 acid.

The composition may also include other additives known in the art such as stabilizers, surfactants, wetting agents and the like.

By way of example only, the present invention will now be described with reference to the following Examples.

15 A composition was prepared by mixing 120kg humic and/or fulvic acid with 7.5kg of a dye available from Barnett Chemicals under the trade name "Brilliant Blue" with 1000kg water. (It is believed that the brilliant blue contains the dye acid blue 9). The composition was sprayed onto a turf grass field at a rate of 0.2L – 1L per 100m² diluted in 2 – 40L water. A preferred rate of application is
20 0.5-1L per 100 m² diluted in 5-10L water. A green colour was imparted to the field.

Comparative trials were conducted by using aqueous compositions comprising either humic and/or fulvic acid or dye on their own in the same amounts and application rates as used above. In both cases, no visible green
25 colour was imparted to the field.

A further trial was conducted using a green colorant conventionally used to colour a playing field. The colorant is a pigment based colorant available under the trade name "Green Lawngr" and manufactured by Becker Underwood, Inc. 90 kg of Green Lawngr was diluted in 1000kg water before
30 spraying as above.

It was observed that in the case of the composition of the invention and the commercially available green colorant, a green colour was imparted to the

field. However, the composition of the invention achieved a similar colour intensity with significantly less colorant than that required using the conventional formulation. Still further, it was observed that the composition of the invention imparted a green colour that was observed to be a far more natural colour and representative of a naturally green field. On the other hand, the conventional green colorant imparted a colour that was observed to be somewhat artificial as compared with a natural grass colour. The present inventor is unaware of a commercially available green turf colorant that imparts a natural green colour. A further advantage of being able to impart a natural green colour to a field is that treated turf can more easily blend in with untreated turf. Such a situation may arise where there are patches of damaged turf to be repaired. Generally, with prior art compositions it is necessary to also spray untreated turf to provide a uniform green colour. This may not be necessary with the preferred composition of the invention.

Still further, the inventive composition was not observed to have any of the aforementioned application difficulties associated with the use of a pigment based colorant, i.e. clogging and/or blockage of applicator nozzles and the like. The present inventor is also unaware of a commercially available green turf colorant that is based on a dye as opposed to a pigment.

It may be seen that the composition of the present invention allows significantly less dye material to be used in order to impart a level of colour comparative to conventional formulations. This ability to decrease the levels of chemical colorants required can reduce potential health risks for workers applying the chemicals, can reduce the build up of chemical residues in the environment and further, due to the decreased amount of colorant can reduce costs. (Humic and/or fulvic acid being less expensive than the available colorants).

It will be appreciated that various changes and modifications may be made to the invention as described herein without departing from the spirit and

scope thereof.

DATED THIS THIRTIETH DAY OF APRIL 2003

AUSTRALIAN AGRICULTURAL CHEMICALS

5 BY

PIZZEYS PATENT AND TRADE MARK ATTORNEYS

This Page is inserted by IFW Indexing and Scanning
Operations and is not part of the Official Record

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☒ BLACK BORDERS
- ☒ IMAGE CUT OFF AT TOP, BOTTOM OR SIDES
- ☒ FADED TEXT OR DRAWING
- ☐ BLURED OR ILLEGIBLE TEXT OR DRAWING
- ☐ SKEWED/SLANTED IMAGES
- ☒ COLORED OR BLACK AND WHITE PHOTOGRAPHS
- ☐ GRAY SCALE DOCUMENTS
- ☐ LINES OR MARKS ON ORIGINAL DOCUMENT
- ☐ REPERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY
- ☐ OTHER: _____

IMAGES ARE BEST AVAILABLE COPY.

**As rescanning documents *will not* correct images
problems checked, please do not report the
problems to the IFW Image Problem Mailbox**